1,167,907

PATENT SPECIFICATION 1,167,907

DRAWINGS ATTACHED.

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Date of filing Complete Specification: 30 Oct., 1967.

Date of Application (No. 49010/66): 1 Nov., 1966.

Complete Specification Published: 22 Oct., 1969.

Index at acceptance:—B8 B(49B, 49C); F2 Q(2T, 7H, 8).

International Classification:—B 66 d 3/22.

COMPLETE SPECIFICATION.

Improvements in or relating to Electrically Operated Chain Hoists.

We, GEO. W. KING LIMITED, a British Company, of Argyle Works, Stevenage, Hertfordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to electrically operated chain hoists.

In electrically operated chain hoists employing a polygonal chain sprocket the chain is subject to vibrations due to the fact that the sprocket gives rise to a variable velocity and displacement of the chain.

It is the chief object of the invention to provide means whereby undesired vibrations of the kind indicated may be substantially reduced if not entirely obviated.

According to one aspect of the invention it is proposed in an electrically operated hoist having a polygonal chain sprocket around which the hoist chain passes to drive the sprocket through the medium of a spur wheel the pitch circle diameter of which is varied in such a manner as to avoid or reduce variations in chain velocity as it passes around the sprocket.

For a better understanding of the invention reference will now be made to the accompanying drawings in which:—

Figure 1 illustrates an assembly comprising a hoist chain sprocket and an associated drive spur wheel which provides for a variable gear ratio,

Figure 2 is a side elevational view illustrating an electrically operated chain hoist unit provided with means for damping vibrations set up as a result of displacement of the chain,

[*Price* 4*s.* 6*d.*]

Figure 3 is a section on the line 3—3 of Figure 2,

Figure 4 illustrates a bottom block equipped with vibration damping means similar to those shown in Figure 2.

Referring now to the drawings there is illustrated in Figure 1 an arrangement for counteracting or mitigating the vibrations set up due to the variable velocity of the chain arising from the employment of a polygonal chain sprocket. In Figure 1, 10 designates a chain sprocket around which a hoist chain 11 passes such sprocket being provided in the embodiment illustrated with five chain link pockets. Splined to the sprocket 10 or to a shaft carrying said sprocket is a spur wheel 12 which is so constructed that the pitch circle and root diameters are varied so as to smooth out varying chain velocities. It will be appreciated of course that the spur wheel 12 must be set (i.e. splined to the sprocket on the shaft carrying the latter) in the correct relationship to said chain sprocket. In Figure 1 the pitch circle radii of the spur wheel is indicated by the line 13 while the pitch circle of the sprocket is indicated at 13a, and it will be noted from the drawing that the minimum pitch circle radius of the spur wheel corresponds to the centres of the chain pockets (i.e. where the chain radius is minimum and an increase in velocity is required) and that the maximum pitch circle radius of the spur wheel corresponds to points at which the chain runs along the pitch circle diameter of the chain sprocket.

In addition to the longitudinal vibrations arising from variable chain velocity a transverse vibration also occurs owing to link displacement between the pitch circle of the

sprocket and a pocket seat. To overcome this vibration arising from such chain displacement it is proposed to fit chain deflection devices both to the hoist and bottom blocks with a view in each case to hold the chain in a plane parallel to the plane of the sprocket pocket as it leaves such pocket. In Figure 2 there is shown a hoist block designated generally by 14 such block being equipped with a polygonal chain sprocket 15 of known type around which a hoist chain 11 passes. 16 denotes a chain guard of generally known type while 17 generally denotes a chain deflector device adapted to hold the chain in a plane parallel to the plane of the sprocket pocket as it (the chain) leaves said sprocket. In the embodiment illustrated the deflector device includes a first elongated guide element 18 which as will be seen from Figure 3 is so constructed or formed as to provide within it a guide channel 19 of T shape in section. Co-operating with the guide element 18 is a second guide element 20 which is so constructed or formed as to provide a longitudinally extending groove or channel 21 (Figure 3), the arrangement being such that when the two guide elements 18 and 20 are in abutting relation as shown in Figure 2 there will be provided therethrough as clearly shown in Figure 3 a longitudinally extending guide passage for the chain which is of cruciform shape in section and is thus able to accommodate and closely to guide the successive chain links. As indicated in Figures 2 and 3 the elements 18 and 20 are coupled together by means of pairs of parallel links 22 which are spring loaded as indicated at 23 in order to ensure that normally said guide elements 18 and 20 will be in abutting relationship as shown in Figure 2. In the event that the chain becomes kinked or distorted the elements 18 and 20 will due to their resilient interconnection be capable of displacement relatively to each other thereby to avoid the possibility of any jamming or locking of the chain. As hereinbefore indicated a chain guard 16 is provided above the deflector device and such a guard may be associated with a cut out limit switch which will operate to cut off the drive to the sprocket in the event of incorrect feeding of the chain.

Figure 4 illustrates a bottom block of known type designated generally by 24, such block including a sprocket 25 around which the chain passes. In this case deflector or guide devices designated generally by 26, 27 each similar to that described with reference to Figure 2, are fitted to the block to co-operate with both falls or runs of the chain as it enter ands leave the sprocket 25 of said bottom block.

WHAT WE CLAIM IS:—

1. An electrically operated chain hoist incorporating a polygonal chain sprocket around which the hoist chain passes and in which said sprocket is driven through the medium of a spur wheel the pitch circle diameter of which is varied in such a manner as to avoid or reduce variations in the velocity of the chain as it passes around said sprocket.

2. An electrically operated chain hoist as in claim 1 in which the chain sprocket is operatively connected to the spur wheel in such a manner that a minimum radius of the pitch circle of the spur wheel will coincide with the centre of a chain pocket in said sprocket while a maximum radius of the pitch circle of said spur wheel will coincide with a point at which the chain runs along the pitch circle diameter of the chain sprocket.

3. An electrically operated chain hoist as in claim 1 or 2 in which deflector or guide means are provided which are effective to damp vibrations in the chain transverse to the sprocket axis which vibrations would otherwise occur owing to link displacement between the pitch circle of the sprocket and the pocket seat.

4. An electrically operated chain hoist as in claim 3 and including a bottom block also incorporating a polygonal chain sprocket in which said bottom block is fitted with two sets of deflector or guide means effective to co-operate with both falls or runs of the chain as it enters and leaves the sprocket of said bottom block thereby to damp vibrations transverse to the sprocket axis.

5. An electrically operated chain hoist as in claim 3 or 4 in which the or each deflector or guide means comprise two elongated guide elements disposed at opposite sides of the path of travel of the chain, such elements being resiliently interconnected so that while normally being maintained in abutting relationship they are displaceable outwardly relatively to each other and each such element incorporating a longitudinally extending guide passage such that when the two elements are in abutting relation a guide channel of substantially cruciform shape in section will be provided for the chain.

6. An electrically operated chain hoist as in claim 5 in which the guide elements are interconnected by means of a plurality of parallel links, spring means being associated with at least one pair of such links in such a manner that normally said guide ele-

ments will be maintained in abutting relationship.

7. An electrically operated chain hoist substantially as hereinbefore described with reference to Figure 1, Figures 2 and 3 or Figure 4 of the accompanying drawings.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1969.
Published at The Patent Office, 25 Southampton Buildings, London, W.C.2,
from which copies may be obtained.

1167907 COMPLETE SPECIFICATION

3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

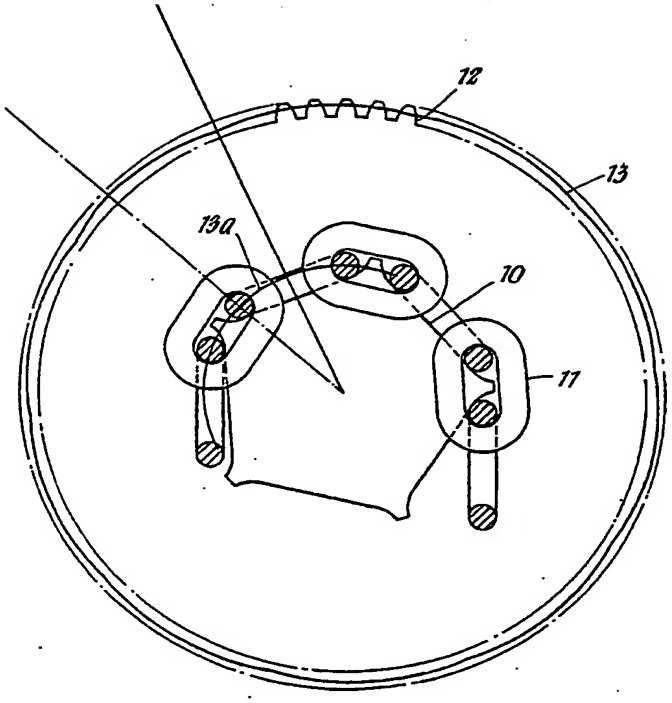

FIG.1

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3 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 2

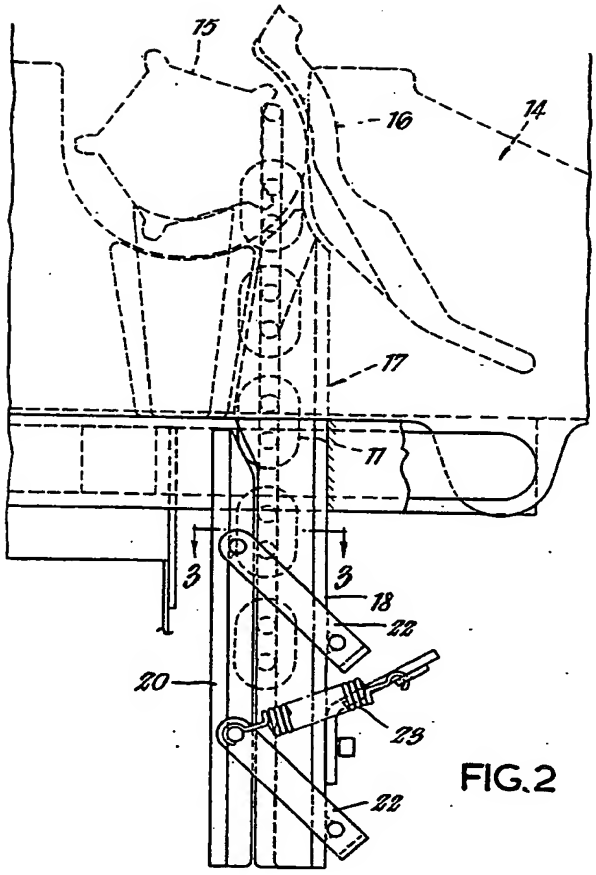

FIG.2

1167907 COMPLETE SPECIFICATION
3 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 3

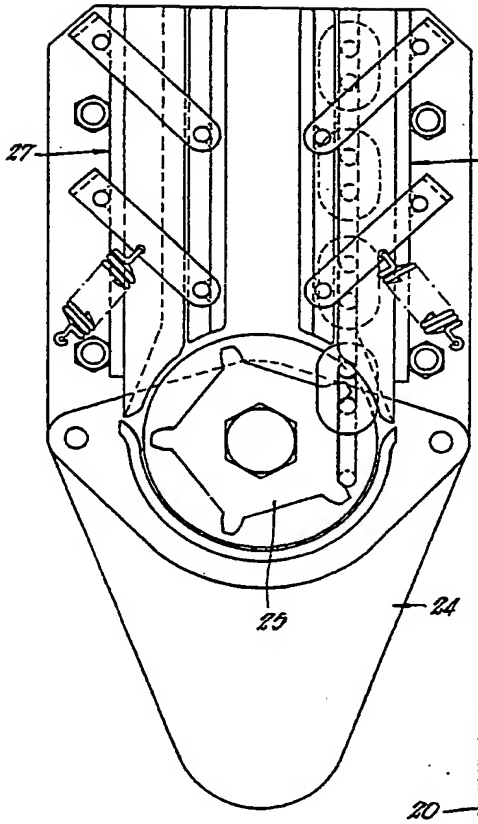

FIG. 4

FIG. 3